

A REVIEW OF *META* (ARANEAE, TETRAGNATHIDAE), WITH DESCRIPTION OF TWO NEW SPECIES

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ABSTRACT. The validity of the genera *Meta* C. L. Koch and *Metellina* Chamberlin & Ivie is supported, mainly based on genital structure and living habitats. Two new species, closely related to and earlier partly included in *Meta menardi* (Latreille) (limited to Europe), are described: *M. americana* n. sp. (eastern North America) and *M. manchurica* n. sp. (Russian Far East). The additional species of *Meta* are *M. bourneti* Simon (southern Europe, Caucasus and Canary Islands) and *M. dolloff* Levi (California).

The status of the genera *Meta* C. L. Koch, 1836 and *Metellina* Chamberlin & Ivie, 1941 has been unstable. Levi (1980) treated them as valid genera in his North American revision. Although this concept has been followed by some recent authors (Levy 1985; Marusik 1985, 1986; Yaginuma 1986; Coddington 1990), some others have considered *Meta* a senior synonym of *Metellina* (Wunderlich 1987).

The genus *Meta sensu stricto* includes three known species, *Meta menardi* (Latreille), *M. bourneti* Simon and *M. dolloff* Levi. The first mentioned has been regarded as a Holarctic species. The material previously treated as *M. menardi* appears to include three very closely related species, with allopatric distributions. The two new species will be described here.

THE GENERA *META* AND *METELLINA*

We cannot agree with the synonymization of *Meta* and *Metellina* made by Wunderlich (1987). As Levi (1980) clearly pointed out there are marked differences in body shape and in genitalia of both sexes; see figs. 95-135 in Levi (1980) and figs. 49, 54 in Coddington (1990). The main differences in genitalia between genera *Meta* and *Metellina* are: epigynum, embolus, conductor and paracymbium sclerotized in *Meta* and not in *Metellina*, embolus free in *Meta* and covered by conductor in *Metellina*, base of embolus complex (apophyses) in *Meta* compared to the simple

base in *Metellina*, conductor directed prolaterally in *Meta* and more horizontally in *Metellina*, and epigynal openings posterior in *Meta* and ventral in *Metellina*. Coddington (1990) pointed out the difference in the sperm duct routing through tegulum in *Meta* (complex) and *Metellina* (simple). The size of *Meta* varies from 8-17 mm and that of *Metellina* from 4-8 mm, and the abdomen of *Meta* is almost as high as long. The species of *Meta* live in caves (however, see Pennington 1979) and only a few species of *Metellina* occur in cave entrances, the rest living outside of caves.

The placement of *Meta* at the family level is also open to discussion. Traditionally it has been included in Araneidae (e.g., Locket & Millidge 1953), and Simon (1929) placed *Meta* in the subfamily Tetragnathinae. Locket et al. (1974) transferred *Meta* into Tetragnathidae, and recently it has been considered either in the family Metidae, or in the subfamily Metinae within Tetragnathidae or within Araneidae (see e.g., Heimer & Nentwig 1982; Roberts 1985; Levi 1986; Wunderlich 1986). Differences in anatomy and genitalia between metids and tetragnathids have been pointed out, e.g., by Palmgren (1978) and Coddington (1990). We prefer to include *Meta* in the subfamily Metinae within the family Tetragnathidae until new data is available.

THE GENUS *META* C. L. KOCH

For description and figures of *Meta bourneti*, known from southern Europe, Caucasus and Ca-

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nary Islands, and of *M. dolloff*, from California, see Locket & Millidge (1953), Levi (1980) and Roberts (1985).

Meta americana, new species

Figures 1-4, 14

Types.—Male holotype, male paratype and female paratype from USA, Pennsylvania, NE of Jamison, Horseshoe Bend, Neshaminy Cr. (40°16'N, 75°03'W); June 1954, leg. W. Ivie; deposited in the American Museum of Natural History, New York. One male and one female paratype from the same locality and date; deposited in the Zoological Museum, Moscow State University, Russia. Three male paratypes and one female paratype from Canada, Ontario, Eganville, Bonneshere Caves (45°30'N, 77°00'W); 12 June 1972, leg. S. Peck; deposited in the Canadian National Collections, Ottawa.

Etymology.—The specific name refers to the distribution area.

Diagnosis.—*M. americana* differs from closely related *M. manchurica* and *M. menardi* in the shape of copulatory organs. *M. americana* has the widest tegulum and numerous small denticles on conductor (Figs. 1, 14). Unlike *M. menardi*, *M. americana* has clearly divided apophysis on the embolus base (Fig. 2) as does *M. manchurica*. The ridge on the embolus base of *M. americana* is higher and wider than that of *M. manchurica* (Figs. 1, 2 and 5, 6). The paracymbium is distally not so rounded as that of *M. manchurica* and *M. menardi* (Figs. 3, 7, 12). Females of *M. americana* can be recognized by the shape and coloration of the epigynal bulge which is wide and darker than the basal part of the epigynum (Fig. 4).

Description.—*Size*: total length of males 7.0–10.1 mm, of females 7.8–13.7 mm; carapace length of males 3.7–5.0 mm, of females 4.0–5.9 mm; carapace width of males 3.0–4.0 mm, of females 3.3–4.5 mm; leg I (femur-patella + tibia-metatarsus + tarsus) of males 9.5–8.0–10.5 mm, 7.2–10.2–11.1 mm and 7.5–10.4–11.2 mm, of females 6.5–8.2–8.5 mm and 7.5–9.5–9.8 mm. Coloration, see Levi's (1980) description and figs. 113–115.

Male palp: see Figs. 1-3, 14, and figs. 124-127 in Levi (1980). Conductor with numerous small, thin denticles, tegulum wide.

Epigynum: see Fig. 4 and figs. 116-120 in Levi (1980). Bulge darker than basal part of epigynum.

Distribution.—Eastern North America (main-

ly east of the Mississippi River); the northernmost records are from Newfoundland, Nova Scotia, southern Québec and northern shore of Lake Superior; in the south it reaches the northern parts of Georgia, Alabama, Arkansas and Oklahoma, the southernmost record being from Louisiana, Baton Rouge (Levi 1980: map 5).

Material examined.—Type material, and 13 males and 17 females from Canada (Nova Scotia, New Brunswick, Québec and Ontario; in the Canadian National Collections and in the Zoological Museum, University of Turku). In addition, Prof. H. W. Levi kindly compared present figures with a number of specimens from the USA (in the Museum of Comparative Zoology, Harvard University).

Meta manchurica, new species

Figures 5-9, 15

Types.—Holotype male from Russia, Primorski (Maritime) Province, 20 km SW from Partizansk, entrance of a cave; 2 May 1978, leg. A. Lelei. Two female paratypes Primorski Prov., Khasan District, Nerpichya Bay, cave; 3 September 1978, leg. B.P. Zakharov. Types are deposited in the Zoological Museum, Moscow State University, Russia.

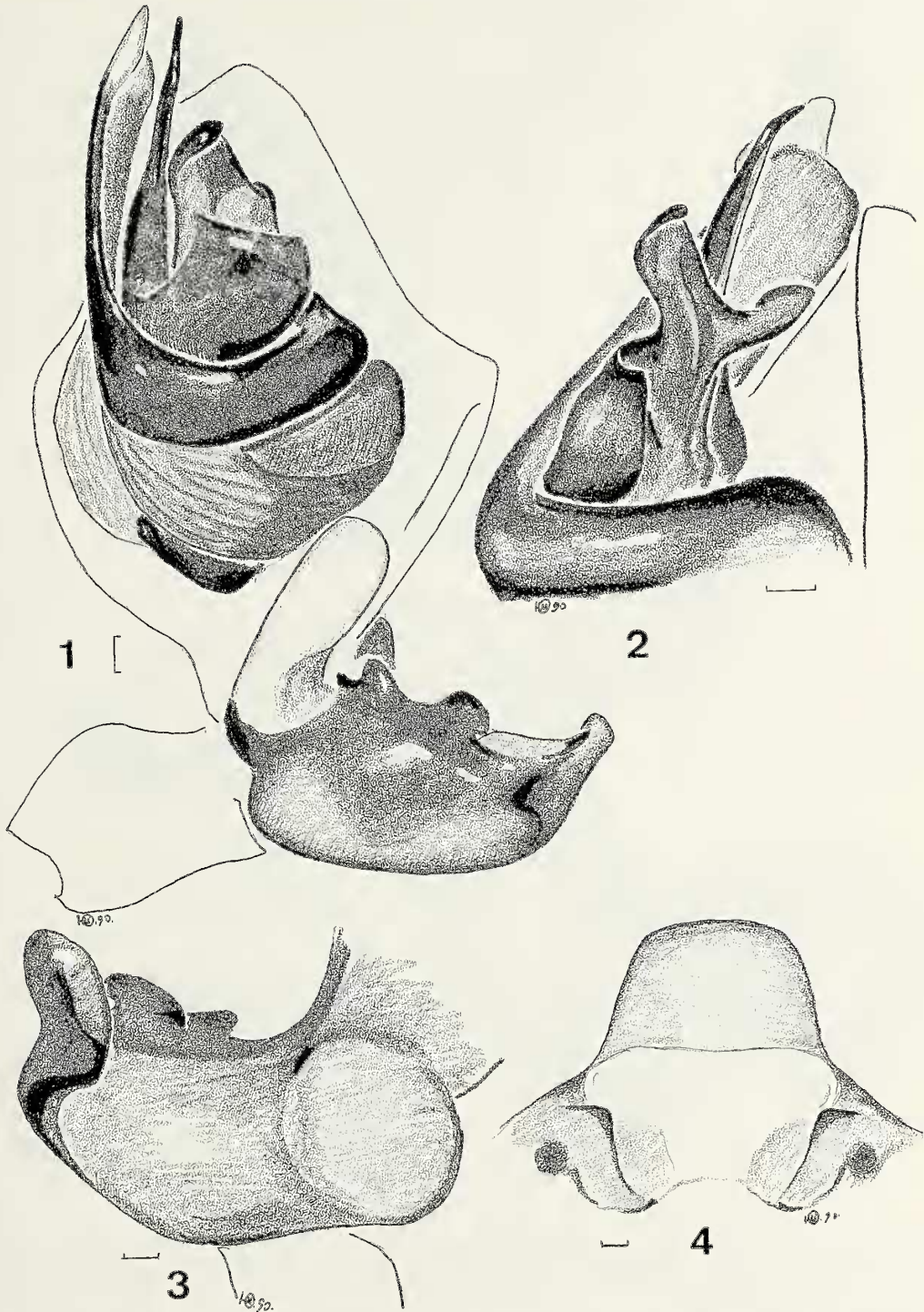
Etymology.—The specific name refers to the distribution area.

Diagnosis.—*M. manchurica* can be distinguished from closely related *M. americana* and *M. menardi* by copulatory organs. Tegulum of *M. manchurica* is somewhat thicker than that of *M. menardi* but thinner than of *M. americana* (Figs. 1, 5, 10). Denticles of conductor thick as in *M. menardi* but shorter and more numerous (Figs. 15-16). Unlike in *M. menardi* and *M. americana*, apophyses of the embolus base are pointed in *M. manchurica*, and ridge at the embolus base is low and short (Fig. 6). Females of *M. manchurica* can be recognized by the wide epigynal bulge (Figs. 8, 9).

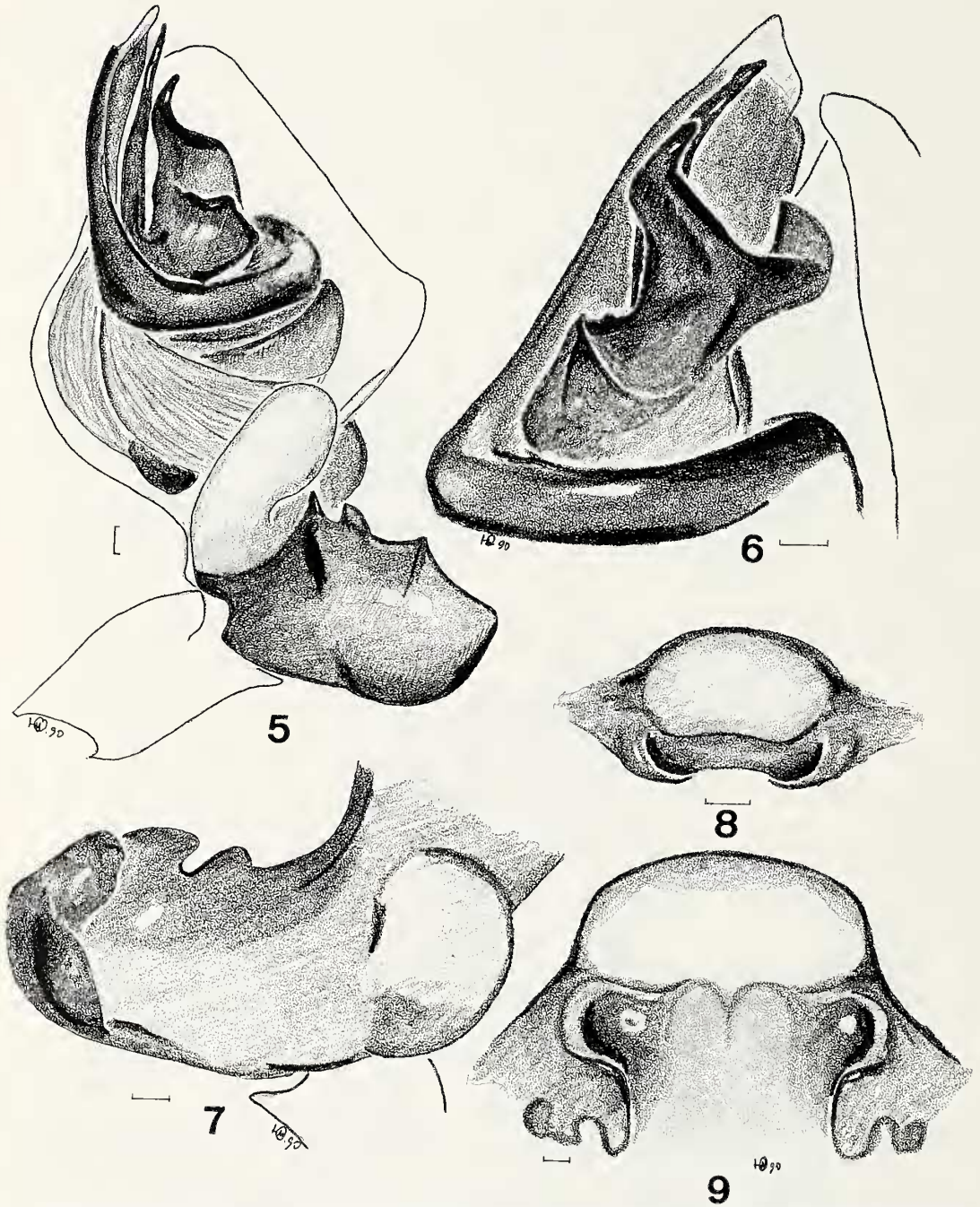
Description.—*Size*: male 10.2 mm, females 11.6–12.2 mm; carapace length of male 4.8 mm, of females 5.2 mm; carapace width of male 4.0 mm, of females 4.0–4.4 mm. Leg I (femur-patella + tibia-metatarsus + tarsus) of male 7.5–10.1–11.4 mm, of females 7.8–10.0–11.0 mm and 8.0–10.5–10.6 mm. Coloration as in *M. menardi* but darker.

Male palp: see Figs. 5-7 and 15. Conductor with numerous thick denticles, base of embolus with pointed apical and dorsal apophyses, ridge on base of embolus low and short.

Epigynum: see Figs. 8-9. Wide pale bulge, bas-



Figures 1-4.—*Meta americana* n. sp., types from Pennsylvania: 1, left male palp; 2, embolic apophysis; 3, paracymbium; 4, epigynum (posterior view). Scale bars: 0.1 mm.



Figures 5-9.—*Meta manchurica* n. sp., types from Primorski Province, Russia: 5, left male palp; 6, embolic apophysis; 7, paracymbium; 8, epigynum (ventral view); 9, epigynum (posterior view). Scale bars: 0.1 mm for Figs. 5-7 & 9; 0.25 mm for Fig. 8.

al part of epigynum is darker than the apical one (bulge).

Distribution. — Maritime Province of Russia, possibly also Japan and Korea.

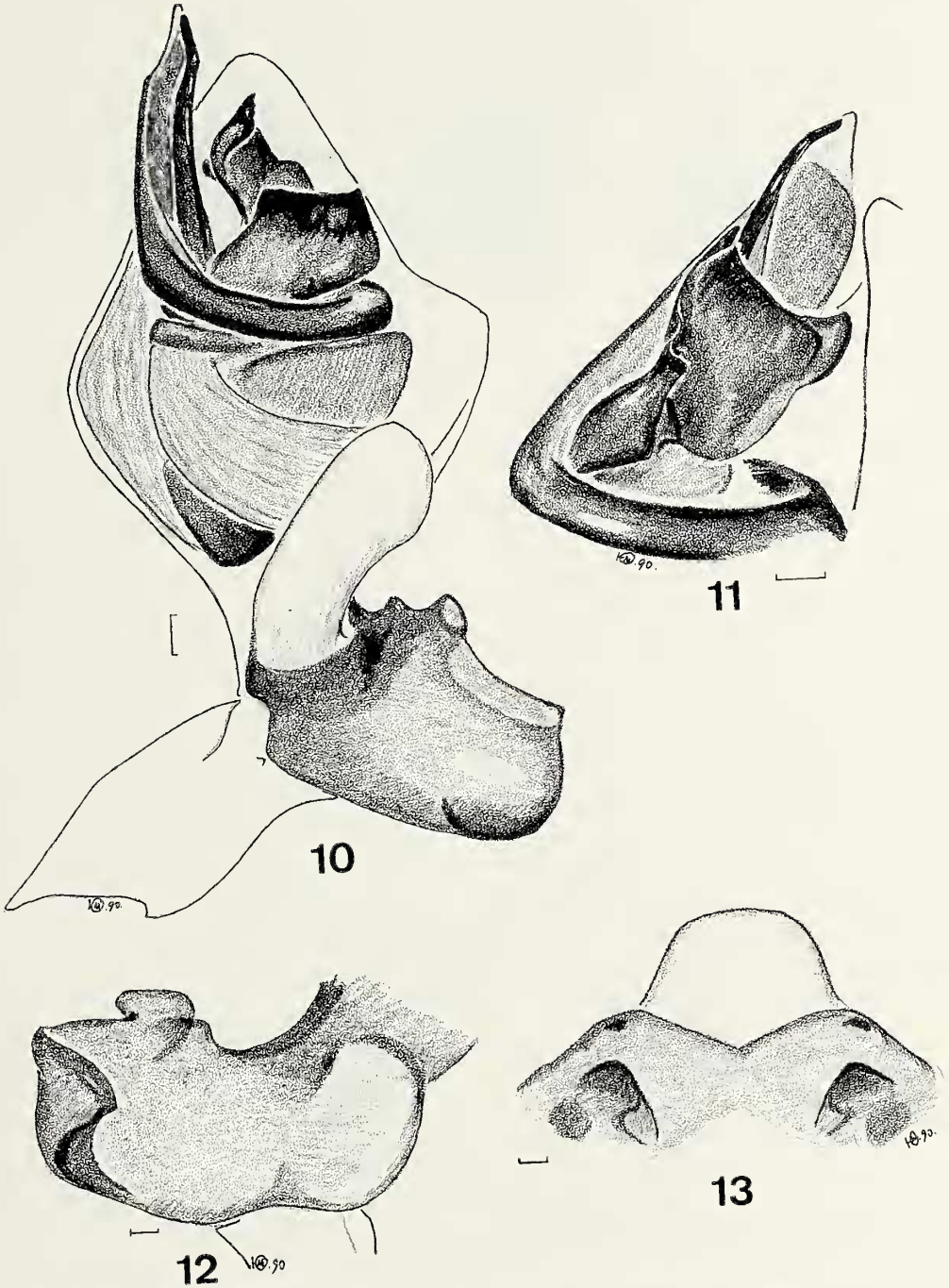
Material examined. — Only types.

Meta menardi (Latreille, 1804)

Figures 10-13, 16

Diagnosis. — See that of *M. americana* and *M. manchurica*.

Description. — See Wiehle (1931), Locket &



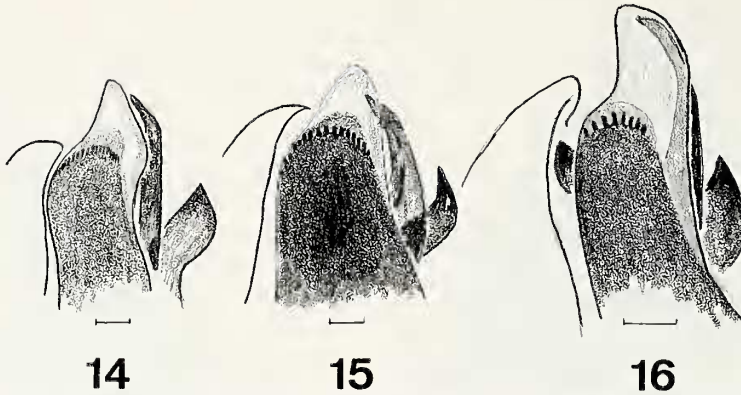
Figures 10–13.—*Meta menardi* (Latreille) from Germany: 10, left male palp; 11, embolic apophysis; 12, paracymbium; 13, epigynum (posterior view). Scale bars: 0.1 mm.

Millidge (1953) and Roberts (1985) and Figs. 10–13, 16.

Size: total length of males up to 12.5 mm (specimens from Sweden), 10–11 mm (Roberts 1985), of females up to 15.1 mm (from Sweden),

12–15 mm (Roberts 1985); carapace length of males up to 6.0 mm (Sweden), 5–5.5 mm (Wiehle 1931), of females up to 6.6 mm (Sweden), 6–6.5 mm (Wiehle 1931).

Male palp: see Figs. 10–12, 16.



Figures 14–16.—Tip of conductor of *Meta*: 14, *M. americana* n. sp.; 15, *M. manchurica* n. sp.; 16, *M. menardi* (Latreille). Scale bars: 0.1 mm.

Epigynum: see Fig. 13.

Distribution.—Western Europe. Probably also North Africa (Algeria) and perhaps Middle East (Syria) (Roewer 1942; however, see Levy 1987). The northernmost known records are from British Islands, including Ireland and Scotland (Locket et al. 1974), from the Arctic circle on Norwegian coast, central parts of Sweden and southwestern corner of Finland (Hippa et al. 1984). The easternmost records are from Latvia, and from Moldova and other Transcarpathian areas (K. G. Mikhailov, unpubl. catalogue).

Material examined.—Several males and females from Germany, Sweden and Norway (in the Institute of Biological Problems of the North, Magadan, in the Swedish Museum of Natural History, Stockholm, and in the Zoological Museum, University of Turku). Drawings of the material from (eastern) Germany, Hinter Sächs. Schweiz, Gr. Winterberg, S-Kuppe (420–490 m); June 1978, leg. S. Heimer.

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